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ABSTRACT

Technology is becoming a viable supplement to lectures, printed textbooks, and even courses, which are being designed around technology. A study of 123 public speaking fundamental students found that the current technologically focused classroom is not equal for both males and females. Students would enjoy using technological supplements if instructors implemented the technology into the classroom for enhancement. This research found that the presumption of more technology equaling a higher level of learning does not always hold true. (Contains 3 charts of data and 14 references.) (Author/RS)

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Technology and Texts:

Hearing the Student Voice

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Tiffany Mindt

Paper presented at the Annual Meeting of the Central States Communication Association (Milwaukee, WI, April 3-7, 2002

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Abstract

Technology is becoming a viable supplement to lectures, printed textbooks, and even courses are being designed around technology. A study of 123 public speaking fundamental students found that the current technologically focused classroom is not equal for both males and females, due to the differences in experiences and comfort levels with males and females. Students would enjoy using technological supplements if instructors implemented the technology into the classroom for enhancement. This research found that the presumption of more technology equaling a higher level of learning does not always hold true.

Introduction

In the last few decades, technology has been creeping into the classroom in ways never thought possible just a few years prior, beginning with overhead projectors, to video equipment, to computers, to PowerPoint presentations, and now even online texts. Technology has not only changed the presentation of the lecture materials, it has changed the format of the classroom. We have developed classrooms built around computer systems. Technology has even redefined the parameters of what is considered the basic requirements of a college education by no longer requiring the classroom environment or face to face interaction between students or student and teacher, through the creation of online courses.

Technology seems like such a positive and inevitable part of our education. However, in the rush to keep up with technology and their quickly advancing educational neighbors, educators and universities often make the mistake of believing that increased technology equals increased levels of education. But, is this the case? Is there a limit on this? And, if so, where lay the parameters?

Individuals have different comfort levels with technology. To push technology in the classroom without regard for these comfort levels may make the classroom uncomfortable. Research has shown that less comfortable learning environments lead to less learning. In addition, if there is a large ability gap between technologically advanced students and less technologically experienced students, is an educational environment that uses classroom technology disadvantaging certain students? Finally, what about those students who do not own computers in their homes? How able are these students to

use the CD-ROMS or technologically supported texts? Are they at any distinct disadvantage due to accessibility?

Rationale

As stated, technology is becoming more and more prevalent in education. Some students are more familiar with the chosen technology than the instructors, while other students have never used the technology before. It is important that educators continually strive to better their classroom, to better reach their students, and technology can be an effective means of achieving this. However, to achieve this, it is equally as important that educators seek to understand the boundaries and ethics of technology in the classroom. In order to do this, instructors need to better understand the students' perceptions of technology. Also, because the intent of this technology is to help students learn the information in a better and more efficient way, it is important to ask if the students actually find this new technology effective.

Definitions

Traditional textbooks are in book form. There are no technological supplements of any kind. These are the books that instructors have used for many years. With traditional textbooks, instructors choose the one that they feel best meets the needs of the class.

Electronic interactive textbooks appear in the form of a CD-ROM or as a website. Students interact with the material as they read through the chapters. Interaction can take place through watching video clips, answering questions, or even connecting to different links from the textbook website. With electronic textbooks, instructors pick and custom design the books by choosing different chapters and articles that they want to include in

their text. Instructors can also upload their own notes and personal materials to be included in the textbook.

Review of Literature

Many argue that our current textbooks are not adequate and that something new is needed to better adapt to student needs. In years prior, there was difficulty obtaining support for technology based projects. According to Kneedler (1993), not many in the technology industry or in the publishing industry were interested in funding multimedia programs (p. 2). This has now changed. "Textbooks have been a mainstay in education for decades, but their role as an anchor in the curriculum is changing" (p. 1). Many people, both students as well as educators, feel that textbooks are too broad and that they don't go into detail as much as they should on certain topics. Without going in depth on topics and giving the students something to relate to, they feel the textbooks aren't reaching their audiences as effectively as they could be. Kneedler (1993) stated that "traditional texts do not actively engage students, appeal to a variety of senses or cause students to develop life-long interests" (p. 2). With the transitions towards a more technological society came changes in the educational focus. Today, educational technology is becoming more and more prevalent, changing the face of textbooks. Textbooks now can be supplemented by technology, sold to schools as computerized units that are formed to the schools preference and then printed for the students, or even completely computerized, online texts.

Textbooks supplemented by technology are a relatively new phenomenon. "A milestone has been set in American education" ("The multimedia textbook", 1993). This statement was made after a multimedia-based curriculum was approved for high school

textbooks. Multimedia and interactive textbooks are now becoming more prevalent in classrooms across the country. The multimedia curriculum that was adopted for high school textbooks in Texas was called Texas Learning Technology Group (TLTG) Chemistry 1 (p. 1). The course was based on a series of interactive laser discs ran by an IBM multimedia presentation system. Also included were print materials and laboratory experiments (p. 1). With the TLTG technology operating, there was great potential for more technology in curriculum.

Another technological possibility for classrooms is textbooks sold on computer to the school or university. The school then customizes the textbook and prints and can print the new, customized text for their students. There are many benefits to colleges and universities publishing their own textbooks. One such example of a university benefiting from such a program is the University of California, San Diego. UCSD was among the first school's to adopt McGraw-Hill Inc.'s Primis Publishing System ("Texts can contain", 1992, p. 1). This system allowed the school to customize their own textbooks. Professors at the institution could choose the materials to be put into the text. They could choose recent materials and supplement these with their own notes or recent articles relating to the course material. After choosing what they wanted in their texts, they place their order and within two to three weeks they would have their texts. If extra copies are needed, instructors can place their orders and receive the extra copies in 48 hours (p. 2). Shortly after adopting the publishing system, "in 1991, the campus opened its own publishing center using Primis" (p. 1). They were among the first to recognize the benefits of publishing their own textbooks.

There are also, now, textbooks that are fully computerized, on CD-ROM's or online. These 'books' are not only bought in computerized form, they are used by the students on computer as well. Many companies and individuals advocate these texts as a means of adapting the classroom to the needs of the students and the multiple learning styles of a class. Digital Learning Interactive, a company pioneering a form of online text, promotes these textbooks as a means to deliver information to students in an active, rather than passive, manner (Smith, 2000, p. 1). Like Primis Publishing system, with Digital Learning Interactive, instructors "can customize an already-developed online textbook to their own needs and the needs of their students" as stated by Smith (p. 2). The model mobilizes the Internet in an attempt to allow teachers to reach their students more effectively. Instructors can customize already established textbooks or piece together their own.

According to Smith (2000, p. 1), "most instructors use textbooks as supplements to their lectures and very often the relationship between what the student reads and hears in class in not clear". The teachers often disagree with the textbooks and have to decide how they want to compensate for this difference. No single author knows everything about a given topic, not all students learn the same way, and not all schools teach in they same ways. Along those same lines, instructors know their students better than authors or publishers but don't have the time, money, or resources to write their own textbooks (Smith, 2000, p. 2).

According to Santor et. al. (1995), "multimedia textbooks on computer are a major advance over conventional textbooks in educating" (p. 1). One of the many reasons for adopting multimedia textbooks is easy updating of information. The

textbooks are computer based, so, with only a few clicks, a textbook can be updated. "These new electronic or multimedia textbooks appear similar to conventional books but differ in function. In addition to text and images, they contain video and audio clips and allow readers to interact with the content" (Santor, 1994, p. 1). According to Smith (2000), the texts are then online, and the students read the information and answer questions or discuss the topics before they move on to the next material (p. 4). Students today are much more accustomed to using computers. With multimedia textbooks, Santor et al. feels students can access information and learn in a way they are more accustomed too.

In a study conducted of third and fourth year medical students, it was found that multimedia textbooks "may be a viable alternative to lectures or printed textbooks" (Santer et al., 1995, p. 1). As stated previously, in the past no one was interested in funding such programs as multimedia textbooks (MMTB). Today it is a reality. According to Santer et al. (1995), multimedia textbooks "are similar to conventional books but differ in function in that they contain video and audio clips and animation that allow the reader to interact dynamically with the content" (p. 2). In this study, researchers used medical students to learn the effectiveness and efficiency of MMTBs. The results were surprising. They found that the MMTB had greater effectiveness than a lecture. However, and here is the point of interest, in terms of efficiency "as measured by fact-based knowledge gain per unit time" MMTBs were only equal to that of the lecture and the textbooks (Santer et al., 1995, p. 3). Regardless of the fact that these MMTB's did not increase efficiency, it was found that the students very much enjoyed using the

multimedia textbooks because these allowed for the learners to absorb material at their own pace (p. 1).

Research Question

The purpose of this study is to understand the students' perception of the technology available to them with textbooks. Specifically, this research assesses the general comfort level with technology in the classroom, the past experience with technology in the classroom, and, finally, the perceived role of technology in the classroom within the university's student body.

Survey Procedure and Results

The instrument used is a 13 question survey, composed of 10 closed-ended questions, using a Likert scale for student responses, and 4 open ended questions. The closed-ended questions focused on assessing the student's general comfort level with technology, his or her past experiences with technology, and their current use of technology. The open-ended questions elicit student reactions to new classroom technology, current text-book supplements, and suggestions to instructors concerning use of technology in the classroom.

Subjects

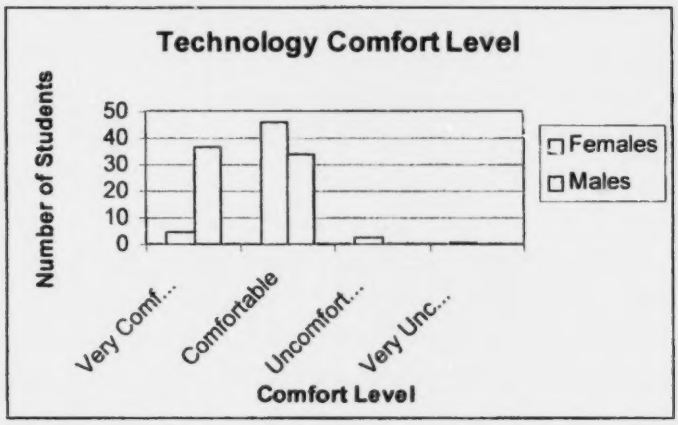
A survey was distributed to several sections of an introduction to public speaking class at a Midwestern university to record the students' perceptions of technology in the classroom. This course was selected because it is a general education requirement, and, therefore, spans all majors and grade levels. In addition, the public speaking course has adopted new textbooks this year that use a CD-ROM supplement, as well as online

supplements. Therefore, the students have had, throughout the semester, much exposure to some of the most predominant forms of classroom technology.

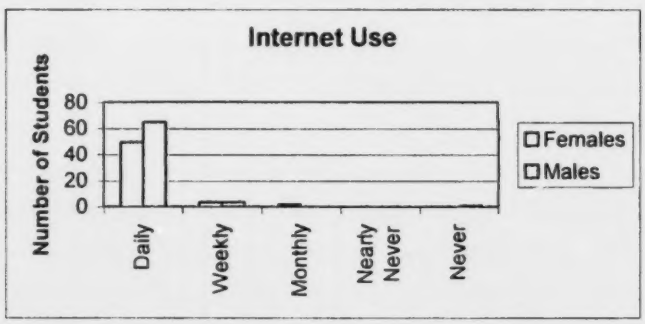
The instructors distributed the surveys to their classes. One hundred and twenty-three surveys were collected, 52 from female respondents and 71 from male respondents. All of the surveys were returned for a 100% response rate of those actually given the survey. Statistics were not gathered on how many students chose not to remain in the classroom the extra time required to participate in the survey. One survey was discarded due to unfitting responses. The identities of the participants were kept confidential. The surveys did not ask for names of participants; however, participants were asked to disclose their sex, year in school, and major.

Close-Ended Questions

There were several different close-ended questions that were relevant to this study. Their content could be divided into three categories: comfort level with technology, current use of technology, and experience with technology in the classroom. First, participants were asked to rate their level of comfort with technology on a likert scale. This yielded a very striking, unanticipated result— reported comfort levels differed greatly between the sexes. Fifty-two percent of males ranked their comfort levels with technology as 'very comfortable', while only 13% of women ranked themselves as 'very comfortable'. When asked to reflect on their past use of technology in the classroom, 13% of women stated they were uncomfortable with this past use of technology. In the same question, 49% of men ranked their comfort level with this past use as 'very comfortable'.

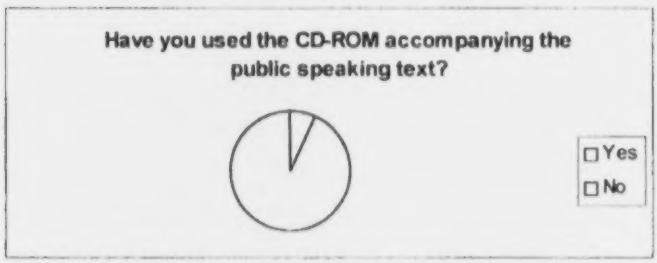


Another set of closed ended-questions inquired about the participants' current use of technology outside of the classroom, whether personal or school-related. Nearly all of the participants reported using the Internet daily.



However, a difference was found between the sexes. Fifty-four percent of males reported using software databases such as CD-ROMs either daily or weekly. Only 15% of females reported using software databases daily or weekly. This difference in experience is striking, since CD-ROMs are one of the most common forms of technological support accompanying class materials.

Finally, the third set of closed-ended questions focused specifically on the participants' experience with technology in the classroom, present or past. First, the section focused on their current experience with classroom technology. Each student received a CD-ROM accompaniment to the Public Speaking textbook. The first question in this section inquired about their use of this CD-ROM. Ninety-seven percent of the students reported that they had never used the CD-ROM.



In addition, the text also has accompanying online sites. Nearly all of the respondents reported they had never visited the websites. Of the 5 respondents who had visited the websites, all five stated the sites were either very or somewhat useful. Then, the section inquired about their past experiences with technology in the classroom. Sixty-three percent reported having CD-ROM's accompany their texts in prior classes; however, 49% report having used these CD-ROMS. When asked if the CD-ROM was helpful, 54% of those responding stated it was either somewhat or very helpful.

Open Ended Questions

Finally, the survey concluded with five open-ended questions concerning technology in the classroom, including the new electronic texts and technological supplements.

Coding

For these questions, the answers were initially reviewed. Then, categories of responses were formed from dominant themes. Two coders then read and categorized each of the responses. Differences in categorization were discussed and resolved. If one answer included responses from multiple categories, the response was categorized under each appropriate category.

The first question asked how the respondents would feel about an entire textbook on computer. Of the total number of responses, 59% of the responses were negative, only 41% were positive. Again, a significant difference appeared between the female and male responses. Seventy-three percent of comments made by females were negative, while only 47% of the responses from males were negative. The main concerns fell under two categories, inconvenience and health concerns. Sixty-six percent of the negative responses raised concerns about the inconvenience of an entirely computerized text, mainly concerns over accessibility for those students who do not own computers. One student stated,

> "I would not like having an entire textbook on computer. Some people do not own a computer and many times computer clusters are full. This will limit the amount of time they will be able to read over the material. The material isn't readily available whenever you need it."

Other concerns over inconvenience focused on the potential technical problems with computers, such as viruses and power outages that could interfere with the student's ability to use the computer and the text, "What if you have problems with it on the

computer? Then you can't access the book and may not get the assignments done," and concerns over the lack of portability of a computer as compared to a book. One student summarized the thoughts of many of the respondents when he stated, "I wouldn't like that at all. I like to take my books places and study."

Finally, the second category of negative comments focused on the health issues accompanying prolonged periods of staring at a computer screen. Research has shown that, when using a computer, an individual blinks significantly less and their eyes become dry. One student stated, "I don't like looking at a computer screen for long periods of time—eyes get dry and 'boggled'." Another stated," Reading off a computer screen is uncomfortable and bad for the eyes."

The second open-ended question asked the extent that the respondent felt CD-ROMs, online links, etc, enhance the quality of textbooks. Fifty-eight percent of those responding to the question felt that these technological supplements were effective at enhancing the quality of the text, although nearly a fourth of these stated that the supplements were effective, but only 'somewhat'. Twenty-six percent of those responding felt that technological supplements were not effective at enhancing the quality of a text. Interestingly, the other 16% of those responding stated that these supplements have the potential to be effective enhancements, but only if they are enforced in the classroom. An example of this is illustrated in this student's comments, "I don't think they do much unless they are enforced. Many kids look at the CD-ROM's and just put them aside. If it were assigned, then they would use them, and it would enhance the quality of textbooks."

The third open-ended question asked the extent to which the respondent felt that CD-ROMs, online links, etc, diminish the quality of textbooks. Fifty-five percent of the respondents felt that the supplements did not diminish the quality of the text. However, forty percent of the respondents felt that the supplements did diminish the quality of the texts; their reasons fell under three main categories: supplements take away from the text, the cost of the supplements, and the extra problems that come with technological supplements. For instance, students felt they depended more on the supplement and tended to neglect the material in the text. According to one respondent, "People may use these sources too much and fail to look at the textbook". Another respondent with the same concern added, "It makes the textbook seem less appealing." Another reason participants felt that these supplements diminished the quality of the book is because of accessibility and the technical problems that can accompany technological supplements like CD-ROMS or online sites. For instance, one student stated, "I think that they can cause more problems than they are worth." Finally, respondents considered high costs because of technological supports to diminish the quality of a text.

The final open-ended question requested suggestions for instructors who are considering textbooks with technological supplements. The comments could be divided into suggestions concerning selection and suggestions concerning implementation. The main suggestions for selection focused on ensuring the technology was user friendly, easy to use, relevant, and inexpensive. With suggestions for implementation, a dominant theme emerged. Over half of the suggestions regarding implementation asked that instructors actually enforce the use of the supplements by incorporating their use into the class. One respondent stated, "Incorporate the CD into the homework. Don't just expect

students to use it." Another stated, "Maybe enforcing using the CD-ROM's would help the kids understand the textbooks better." Only a few students asked that instructors not require the use of the supplements.

Discussion

Overall, students do have a positive view of technology, however, with many hesitations and concerns. While most of the students felt that technological supplements can be an effective means of enhancing the textbook, nearly half of the respondents reported that these supplements can actually diminish the quality of a text as well. This study reaches some key conclusions regarding student's perception of classroom technology and important conclusions for teachers considering technology in their classroom

First of all, students have a positive view of classroom technology in the form of a supplement to the text, not as a replacement to the text. Students responded in great number against the use of fully computerized texts, but nearly half supported textbook supplements.

Second, two dominant student concerns dictate their perception of technology: accessibility and implementation. When asked to consider the possibility of computer-based texts, the respondents answered that they felt unfavorably towards implementing this new technology; accessibility was the single most stated reason. Accessibility was also mentioned as a reason that technological supports could reduce the quality of a text.

The second dominant student concern dictating student's perception of technology is its implementation into the classroom. When asked if technological supplements enhance the quality of texts, 16% of the respondents stated that the

supplements could only enhance the quality of the textbook if their use is enforced in the classroom. In fact, when asked their suggestions for instructors considering texts with technological supplements, enforcement/implementation into the classroom was the single greatest response.

Students repeatedly stated that, if not enforced, the technology was left untouched. When asked if they had ever visited any of the online sites that supplement their Public Speaking text, 96% reported they had never visited any of the sites. Of the 4% who had visited the online sites, all felt that the sites were either somewhat or very useful. So, if used, these supplements can be very beneficial. But, only if used.

This factor could also explain the difference between usage rates of their current CD-ROM supplements and past supplements. Their current Public Speaking course does not enforce use of the CD-ROM supplement. As a result, only 7% of respondents reported having ever used the CD-ROM supplement for that particular course. This is a stark contrast to the 31% who reported using the CD-ROM's for prior classes. Over half of those who used the CD-ROM's in their prior classes felt they were either somewhat or very helpful. Yet, even these students who found their prior experiences with CD-ROM's helpful did not use the CD-ROM for their Public Speaking class. The students lack the initiative to use this technology on their own; however, most importantly, they recognize this. And, their number one suggestion for instructors considering textbooks with technological supplements was to enforce them. A teacher who does not enforce the use of these supplements is potentially depriving their students of an opportunity for increased learning.

A third key finding, although unanticipated, is a distinct difference between the sexes in several areas regarding classroom technology. A difference was found in the sexes' reported use of technology outside of the classroom, whether personal or school-related. Fifty-four percent of males reported using software databases such as CD-ROMs either daily or weekly. However, only 15% of females reported using software databases daily or weekly. This difference in experience is striking, since CD-ROMs are one of the most common forms of technological support accompanying class materials. Women also reported different comfort levels with technology. Fifty-two percent of males ranked their comfort levels with technology as 'very comfortable', while only 13% of women ranked themselves as 'very comfortable'. While initially these differences could seem to be ascribed to differences in past experiences, for example men may have more experience and familiarity with technology so feel less hesitant or uncomfortable, a later question seems to dispute that rationale. When asked to reflect on their past use of technology in the classroom, 13% of women stated they were uncomfortable with this past use of technology. Therefore, even after using the technology for a semester, after becoming familiar and experienced with the technology, females still rated their comfort level significantly lower than men. In the same question, 49% of men ranked their comfort level with this past use as 'very comfortable'.

The differing levels of comfort with technology raise a number of concerns. First, because of their lesser experience with CD-ROM's and software due to significantly lower rates of personal usage, are female students disadvantaged entering college courses that use these technological supplements? This is a very alarming question, since CD-ROM's are one of the most common forms of technological supplements and are now

becoming commonplace in the classroom. Second, research has suggested that comfortable learning environments can increase learning. While the males reported feeling 'very comfortable' with the technology, a very minimal percent of women reported this level of comfort. These results suggest that our current focus on technology could be potentially disadvantageous to female students.

Suggestions for Future Research

This study raises many questions for future research. As stated previously, more research could be beneficial to better understand these differences and how the classroom could be better fitted to both sexes.

Additionally, this study raises many ethical questions concerning technology in the classroom. Such as, is it fair to push technology in the classroom beyond the general comfort level in the classroom, especially when past research tells us that increased comfort in educational environment can increase learning? Also, how ethical is the use of classroom technology when there is such a differing comfort-level and experience between the sexes? Another question needing further consideration is, do certain students who lack experience with and knowledge of technology have to spend time on learning the technology rather than the material? In other words, for these students, is classroom technology actually taking away time and effort from learning material? Finally, is it ethical to base a class or parts of a class, such as assignments, on supplements that require computers, when not all students have constant access to computers?

Conclusion

This research may be limited in that only Communication 110 students from one mid-western university are being studied. Also, since this course consists mostly of first

and second year college students, the age and perhaps social status will be somewhat similar. Regardless of these limitations, this research could greatly benefit the graduate teaching assistant program at the university and other universities. This research has the possibility of opening doors for further research in this area.

In summary, this study concludes that the current technologically focused classroom is not equal for both males and females, due to the vast differences in experiences and comfort levels with the different sexes. In terms of use of technology, students would rather use supplements than replacements and, when using these supplements, instructors must implement the technology into the classroom for it to be an effective enhancement. Finally, rather than accepting the presumption that more technology equals a higher level of learning, this study concludes that this common presumption does not always hold true and more research is needed in the area of classroom technology.

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